

Brain Tumours / Intracranial tumours.

Def

- The tumours arising from the cellular components within the central nervous system are called primary brain tumour.
- These account for 10% of all neoplasms.
- Tumour that metastasize to the brain are called secondary tumour & are less common than primary.
- These tumours are localised intracranial lesion which occupies space within the skull & may cause a rise in intracranial pressure.

Classification - Glial tumours (commonest) (50-60%)
Meningiomas (about 25%)
Schwannomas (about 10%)

Clinical features -

- Headache - Most common in the early morning
- Decrease consciousness - such as confusion & lethargy.
- Vomiting
- Papilloedema - Edema of optic nerve & visual disturbances.
- Personality changes in case of frontal lobe tumour
- Sensory defect - smell, hearing
- Seizures
- Motor abnormalities
- Coordination disturbance

Investigations -

CT scan - It is an investigation of choice.
- It only indicates site of mass & not its nature.

MRI - MRI is superior to CT scan as it gives a lot of informations i.e. - site, extent, mass effect, infiltration, raised intracranial pressure.

EEG - It shows focal electrical abnormality in the region of mass.

X ray - Mostly normal except there is a bone erosion.

Biopsy.

1) Medical treatment

Treatment i) Decongestive therapy - corticosteroids & mannitol.

ii) Epilepsy is treated by anticonvulsants - Phenytoin.

iii) Radiotherapy - usually recommended in gliomas.

ii) Surgical Treatment -

Craniotomy - Treatment of choice of removal of tumour.

Debulking surgery - Partial removal of tumour, improves quality of life & effectiveness of radiation therapy.

Intra-cranial disorders

- Trauma
- Head injury
- Tumour
- Stroke
- Brain abscess
- Vascular malformation

- Brain Abscess is a bacterial brain infection
also known as Cerebral Abscess.

- Most common bacteria are Streptococcus
bacteriae

- Condition is characterised by ~~not~~ inflammation
in brain due to immune response against
bacterial infection, which leads to
pus formation in brain tissue.

• Complications - ~~brain damage~~

~~Risk factors~~ - Complication of bacterial meningitis
bacterial endocarditis

Pulmonary sepsis

- Predisposing factors - Ear infection
Infection to paranasal sinuses
Weak immune system.

- Pathophysiology - Due to causative factors
↓
Infection occurs in brain tissue
↓
Immune system fight against bacteria
↓
Inflammation leads to formation of Pus
↓
Pus formation causes brain abscess.

- Sign & Symptoms - Headache
loss of balance
Memory loss
loss of vision
Drowsiness, Paralysis
Seizures, loss of coordination

- Diagnosis - History collection
Physical Examination
CBC, ECG
Lumbar puncture
blood culture
chest x ray

- Management - A brain Abscess is a medical emergency. patient needs to be hospitalized.
Brain spectrum antibiotic - Penicillin
- Metronidazole

- ii) I.V antibiotics
- iii) Steroids

Surgical Procedure-

- i) Stereotactic
tactic aspiration
- ii) Craniotomy

Abscess drainage by burr hole
aspiration of pus to
↓ use ICP.

Vascular Malformation

Vascular Malformation are congenital in origin they may present with Hydrocephalus, seizures or focal defect with Hemorrhage.

Arterio Venous Malformation-

AVM are responsible for a small subarachnoid & intracerebral hemorrhage, due to rupture of Arteries & veins it is usually present from birth.

Clinical feature - Hemorrhage

Epilepsy

Headache

Neurological deficit

Investigation -

CT scan - Small lesion

MRI - Clearly shows AVM

Treatment - Surgery
Endovascular Embolization
Radiosurgery
Conservative management
Embolisation - catheterization permits selective embolization.

Spinal chord injury & Disease of SC

Craniovertebral Junction Anomalies -

The term ~~cr~~ craniovertebral Junction refers to posterior skull base i.e.

- foramen magnum
- Adjacent occipital bone
- 1st cervical vertebra
- 2nd cervical vertebra

Classification of Anomalies -

- i) Bony Anomalies - Palatybasia
- ii) Soft tissue Anomalies - Arnold ~~ch~~ Chiari Malformation

Palatybasia - This is congenital anomaly in which ~~there is a~~ is characterised as upward bulge of skull base & foramen magnum into posterior fossa.

Acquired form occurs in patient with Osteomalacia, hyperparathyroidism & peget's disease.

As result of bony deformity, the medulla oblongata & upper cervical chord are stretched.

Clinical features- Short neck, lower cranial nerve palsy & cervical chord compression resulting in - weakness & quadriplegia with varying degree of sensory disturbances & Ataxia.

Diagnosis - X-ray - Shows the superior bulging of base of skull. can be confirmed by a simple test by which consist of line joining the hard palate to posterior rim of foramen magnum on lateral skull.

MRI & CT scan confirms the anomalies.

Surgical Procedure - Surgical decompression of the region.

Arnold Chiari Malformation -

This is a developmental displacement of defect of involving the cerebellum & brain stem.

The anomaly is characterised by downward displacement of medulla into cervical spinal canal along with the herniation of cerebellar tonsils.

This occurs in adult & is associated with hydro/syringomyelia along with the occipital headache & neck pain.

Clinical feature - Lower CN palsies

higher cervical chord compression

Hydrocephalus with raised ICP

Surgical Procedure

i) Posterior fossa decompression surgery

This involve the removal of the bottom of the skull & some time part of vertebral column to correct the bony irregular bony structure.

ii) Spinal laminectomy - This is removal of part of bony roof of spinal canal. This increases the canal's size & reduces pressure on spinal chord & nerve roots.

Ablative surgery — destruction of body

Part or tissue

i) thalamotomy.

ii) Pallidotomy.

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Thalamotomy -

- Surgical procedure in which an opening is made into thalamus of brain.
- This is least common type of lesioning surgery that is used rarely in current practice.

Indication -

- i) - Primarily effective for tremors such as those associated with parkinson.
- ii) - brain hemorrhage,
- iii) - Oedema around the thalamus.

Pallidotomy

- Pallidotomy is a type of neurosurgery used ~~in~~ to treat parkinson's disease, as an alternative to the deep brain stimulation.

It involve placing a tiny electrical probe in the globus pallidus, one of the basal ganglia of brain, to damage it.

It can lead relief to - Tremor
Rigidity
Bradykinesia
Motor fluctuations

Indications - i) Parkinson (after long term treatment of levodopa)

- ii) - Tremors.
- iii) - Hemiballismus

Rhizotomy

- Rhizotomy means cutting the nerve roots that carry pain signals to the brain.
- Cutting of nerve roots at the level of spinal chord.
- The procedure also known as Radiofrequency Ablation. it is used to relieve chronic back pain.

Endarterectomy -

Carotid Arterectomy is procedure to treat carotid artery disease.

It involve removal of atherosclerotic plaque or blockage from artery.

The carotid artery is the main b/w vessels that carry b/w oxygen to brain. blockage may lead to stroke.

Laminectomy - surgical procedure that removes a portion of vertebra called as lamina

Indication help in relieve pressure in case of

- herniated disk
- Narrowing of canal
- tumours
- loss of bladder & bowel due to increase pressure in cervical & lumbar vertebra.

Craniotomy - Surgical operation in which a bone flap is temporarily removed from the skull to access the brain.

It is a critical operation performed on patients who are suffering from -

Indication - Brain tumours
blood clots

Removal of foreign body ex - bullet

Cranioplasty - Surgical operation for the repairing of cranial defects caused by previous injuries or operations such as decompressive craniotomy.

It is performed by filling of defective area with range of materials usually bone piece from patient or synthetic materials.

Stereotactic Brain injury -

Surgical procedure where the lesion frequently a brain tumour is removed with assistance of image guidance, that is previously obtained image (usually an MRI).

Stereotactic surgery require only a small incision & a hole less than $1\frac{1}{2}$ inch in diameter to be hole on skull.

Deep Brain Stimulation-

- Deep brain Stimulation is an elective surgical procedure in which neurostimulator are implanted into certain brain areas.
- These neurostimulator generate electrical impulses that control abnormal brain activities.
- Stimulation of brain area is controlled by a programmable generator that is placed under the skin in the upper chest.

Indications - i) Dystonia ii) Epilepsy iii) Tremor iv) Obsessive compulsive disorder v) Parkinson disease

Burr-hole

Burr hole are small hole that a neurosurgeon make in the skull, Burr hole are used to get relieve the pressure on the brain when fluid such as bld builds up & start to compress brain tissue.

Indication - Sudden subdural haematoma
- Hydrocephalus
- brain cancer
- Pus buildup

Ventriculoperitoneal shunt

A cerebral shunt is a device permanently implanted inside the brain head to drain excessive fluid away from the brain.

They are commonly used to treat hydrocephalus the swelling of brain due to excess buildup of cerebrospinal fluid, lead to an increase ICP which can cause Intracranial haematoma, Cerebral Edema.

Indication - Congenital hydrocephalus
Tumor
Spina bifida
Intracranial hypertension
Dandy walker syndrome

Microvasculature decompression surgery

Surgical procedure to relieve symptoms (pain, muscle twitching) caused by compression of nerve by an artery or vein.

Indicator - trigeminal neuralgia Pain

Pituitary surgery - Used to remove Pituitary gland

Indicator - Pituitary tumour
Hormone secreting tumour
Non - hormone secreting tumour

Embolization - Involves the selective occlusion of b/d vessels by purposely introducing emboli, to block a blood vessel.

Indication - Used to treat bleeding

Neural Implants - Are technological devices that connect directly to brain usually attached on surface of brain, or attached to brain cortex.

ex - Deep brain stimulation.